

COLONY OF THE GAMBIA.

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE YEAR 1915.

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MEDICAL OFFICE,

BATHURST,

GAMBIA,

9th May, 1916.

SIR,

I have the honour to submit, for the information of His Excellency the Governor and transmission to the Right Honourable the Secretary of State for the Colonies, the Medical and Sanitary Report for the Colony of the Gambia for the year ended 31st December, 1915.

I have the honour to be,

Sir,

Your obedient servant,

A. E. HORN,

Senior Medical Officer.

THE HONOURABLE

THE COLONIAL SECRETARY,

BATHURST, GAMBIA.

Annual Medical and Sanitary Report

FOR THE

YEAR ENDING 31ST DECEMBER, 1915.

I. ADMINISTRATIVE.

(a) STAFF.

Dr. A. E. Horn, Senior Medical Officer, in charge of the Medical Department, was absent on leave from 15th April to 1st September, when he resumed duty.

Dr. R. W. Orpen, Medical Officer of Health, Bathurst, acted as Senior Medical Officer during Dr. Horn's absence on leave. He left the Colony on leave of absence on 29th November.

Dr. F. C. V. Thompson, Medical Officer, was employed on active service in the Cameroons from 11th February onwards.

Dr. R. H. Miller, Medical Officer, was on active service in the Cameroons until 13th March, when he was invalided from there to England. He was wounded and mentioned in despatches. On 27th August he was seconded for service with the troops in Somaliland.

Dr. T. Ryan, Medical Officer, was on leave of absence from 10th September onwards.

Dr. J. C. Watt, Medical Officer, was appointed to the West African Medical Staff on 18th August, 1914, but immediately seconded for service in the Royal Navy. He assumed duty in the Gambia on 6th October.

Dr. E. B. Bate, Medical Officer, assumed duty on 29th January. He acted as Medical Officer of Health, Bathurst, from 15th April to 1st September.

It will be seen that throughout the greater part of the year the Medical Staff was shorthanded, although nominally six officers were attached to the Gambia.

Of the Nursing Staff:—

Miss K. M. Gordon, Nursing Sister-in-charge, resumed duty after sick leave, on July 19th.

Miss L. E. H. Maulton, Nursing Sister, was employed on active service in the Cameroons, and mentioned in despatches. She was not available for service in the Gambia throughout the year.

Miss R. Roddan, Nursing Sister, returned from leave of absence on 29th January, and acted as Nursing Sister-in-Charge from 1st February until 18th July.

Miss P. R. di Menna, Nursing Sister, was on active service in the Cameroons from 2nd January until 5th October, when she left the service for nursing duties with the regular army.

Miss E. A. Bernard, Nursing Sister, acted as Nursing Sister-in-charge, from 2nd to 31st January. She left the Colony on leave of absence on 25th January, and has since been on active service in the Cameroons. Her appointment in the Gambia was terminated on the 22nd September.

Miss M. M. Hall, Nursing Sister, was appointed on 25th April and assumed duty on 6th May. She proceeded on active service to the Cameroons on 21st July.

Of the Board of Health :—

Mr. T. J. Gibbs, Town Warden, resumed duty on 29th January until 15th October, when he proceeded on leave of absence.

Mr. G. B. Morey, Assistant Town Warden, was on leave from 6th February until 7th of June. He acted as Town Warden during the absence of Mr. Gibbs.

(b) FINANCIAL.

MEDICAL DEPARTMENT.

EXPENDITURE.

Details.	Estimated.			Actual.		
	£	s.	d.	£	s.	d.
Personal emoluments	6,778	0	0	6,311	9	8
OTHER CHARGES.						
Bush allowance to Medical Officer, MacCarthy Island, at 2s. 6d. a day	35	0	0	—		
Travelling Expenses for Nurses in England	12	0	0	6	7	3
Maintenance of sick (Dietary)	550	0	0	475	16	0
Washing	70	0	0	69	9	0
Fuel	50	0	0	52	8	3
Equipment	75	0	0	59	1	8
Medicines, dressings and medical comforts	325	0	0	297	8	10
Expenses of burials	25	0	0	24	4	5
Vaccinations	200	0	0	250	11	11
Maintenance of lunatics	342	0	0	357	18	11
Infectious Diseases Hospital	10	0	0	8	18	8
Purchase of, and repairs to, instruments	40	0	0	25	13	8
Medical library	10	0	0	2	9	1
Horse and bicycle allowance	200	0	0	105	7	8
Uniforms for attendants	33	0	0	32	9	4
Sea passages for Officers	374	0	0	278	1	8
Fees for special course of instructions to Medical Officers in England	50	0	0	140	6	6
Maintenance of Home for Destitutes	164	0	0	117	15	8
Uniforms for Nurses	12	0	0	48	0	0
Rent for quarters	60	0	0	60	0	0
Laboratory equipment	20	0	0	4	7	2
Infectious diseases prevention	80	0	0	1	8	11
Sundries	30	0	0	27	10	7
Fees for selection of Nurses	—			12	12	0
Outfit to Medical Officers	—			24	0	0
TOTAL	£9,545	0	0	£8,793	16	10

RECEIPTS.

Details.			Estimated.			Actual.		
			£	s.	d.	£	s.	d.
Maintenance of Sick and Sale of Medicines	...	...	100	0	0	109	4	0

FINANCIAL.

BOARD OF HEALTH DEPARTMENT.

REVENUE.						EXPENDITURE.					
			£	s.	d.				£	s.	d.
Local Rates	...	...	1,394	18	6	Salaries and Allowances to Town					
Slaughter House Fees	...	...	122	13	9	Warden and Staff	...	...	926	17	10
Grant-in-Aid	...	...	3,717	19	4	Uniforms	...	...	28	0	0
Private Latrines Services	...	...	52	18	10	Tools	...	...	135	12	5
Miscellaneous	...	...	27	7	4	Upkeep, Horses and Carts	...	...	557	12	8
Fines	...	...	13	10	3	Upkeep, Street Lights...	...	...	199	4	2
Improvement Sanitation	...	...	1	0	0	Cleaning Streets and Drains	...	...	432	4	2
Forfeited Wages	...	...	1	8	2	Cleaning Market and Slaughter					
Cost of Summonses	...	...	0	2	0	House	...	...	45	12	6
Overdrawn Wages	...	...	3	16	8	Emptying Latrines	...	...	410	2	4
						Emptying Dustbins	...	...	169	11	10
						Crude Oils and Disinfectants	...	...	69	4	5
						Anti-mosquito Measures	...	...	231	2	4
						Sea Passages for Officers	...	...	89	16	10
						Cleaning of Cemeteries	...	...	89	16	4
						Repair and Working of Sluice					
						Gates...	...	...	143	4	4
						Cleaning of Government Com-					
						pounds	...	...	104	13	4
						Rent of Quarters	...	...	83	6	8
						Sundries	...	...	20	4	3
						Improvement Sanitation	...	...	40	9	0
						Credit Balance...	...	...	1,558	19	5
Total	...	...	£5,335	14	10	Total	...	...	£5,335	14	10

II. PUBLIC HEALTH.

(a) GENERAL REMARKS.

The health of the Europeans was good throughout the year.

Among the natives, however, small-pox was prevalent in parts of the Protectorate ; particularly the South Bank and MacCarthy Island Provinces. Vaccination was pushed as much as possible in the first quarter of the year, but, in spite of every care being taken to keep the vaccine lymph in good condition, good results were not obtained, owing to the high temperature. The Dispenser in medical charge of MacCarthy Island Station was appointed Public Vaccinator for that station. In December, during the cooler weather, additional supplies of vaccine lymph were obtained and vaccination was extensively performed at the end of the year by the Travelling Commissioners in certain Provinces ; this arrangement was necessary, as no Medical Officer could be spared to travel for the purpose. The results could not be checked in all cases, but, as far as seen, they were fairly successful. Payment was made to the Commissioners for every vaccination performed.

Plague persisted in the adjoining French Senegambia until 19th January, when quarantine was raised at Dakar.

No case occurred in the Gambia.

Malaria was unduly prevalent in Bathurst in September and October, in spite of precautions.

Measles occurred extensively amongst children, but there were only a few fatalities.

Dysentery and diarrhoea were somewhat marked at the close of the rains in Bathurst.

No case of yellow fever occurred in the Colony or Protectorate.

(b) EUROPEAN OFFICIALS.

No death occurred.

TABLE SHOWING THE SICK, INVALIDING, AND DEATH RATES OF EUROPEAN OFFICIALS.

	1914.	1915.
Total number of officials resident	56	44
Average number resident	34	28
Total number on sick list	29	26
Total number of days on sick list	331	161
Average daily number on sick list	0·84	0·44
Percentage of sick to average number resident	85·3	92·8
Average number of days on sick list for each patient	10·79	6·2
Average sick time to each resident	9·2	5·7
Total number invalided	2	—
Percentage of invalidings to total residents	3·5	—
Total deaths	—	—
Percentage of deaths to total residents	—	—
Percentage of deaths to average number resident	—	—
Number of cases of sickness contracted away from residence	—	—

(c) NATIVE OFFICIALS.

TABLE SHOWING THE SICK, INVALIDING, AND DEATH RATES OF NATIVE OFFICIALS.

	1914.	1915.
Total number of officials resident	151	136
Average number resident	136	120
Total number on sick list	133	128
Total number of days on sick list	577	599
Average daily number on sick list	1·58	1·64
Percentage of sick to average number resident	97·8	100·6
Average number of days on sick list for each patient	4·33	4·7
Average sick time to each resident	4·24	5
Total number invalided	—	—
Percentage of invalidings to total residents	—	—
Total deaths	2	—
Percentage of deaths to total residents	1·32	—
Percentage of deaths to average number resident	1·47	—
Number of cases of sickness contracted away from residence	—	—

(d) GENERAL EUROPEAN POPULATION.

TABLE SHOWING THE SICK, INVALIDING, AND DEATHS OF NON-OFFICIAL EUROPEANS.

	1914.	1915.
Total number resident	93	84
Total number on sick list	15	31
Total number invalided	6	—
Total deaths of residents	1	—
Total deaths from passing ships	—	2

Causes of deaths :—Enteric fever and pneumonia. (A German prisoner landed with enteric fever. An official from Lagos.)

The undermentioned tables omitted :—
Comparative statement of births and deaths for the past ten years in the Colony.

Number of deaths and death rate per thousand of the population for the last ten years in the Colony. (Calculated on the last census of 1911.)

Monthly deaths for the past six years in Bathurst.
Infantile mortality for the past eight years in the Colony.

RETURN OF INMATES AT THE HOME FOR DESTITUTES AND AFFLICTED PERSONS FOR THE YEAR 1915.

Sex.	Remained 1914.	Admitted 1915.	Total.	Discharged.	Died.	Remaining 1915.
Male	2	8	10	4	3	3
Female	3	6	9	2	4	3
Total	5	14	19	6	7	6

Causes of deaths :—Trypanosomiasis (1), cardiac diseases (2), dysentery (1), leprosy (1), general paralysis of the insane (1), senile myocarditis (1).

INFECTIOUS DISEASES HOSPITAL.

The following admissions and deaths occurred :—

Diseases.	Admissions.	Deaths.
Chicken-pox	5	—
Small-pox	20	2
Total	25	2

Sanitary arrangements, satisfactory.

Annual Sanitary Report

FOR THE

YEAR ENDING 31ST DECEMBER, 1915.

I. ADMINISTRATIVE.

The Offices under the Board of Health, Bathurst, were held as follows during the year :—

Dr. A. E. Horn, S.M.O., Chairman of the Board, absent on leave from 15th April to 1st September; acted also as M.O.H. from 29th November onwards.

Dr. R. W. Orpen, Medical Officer of Health, Bathurst, and acted as Chairman of the Board from 15th April to 1st September; absent on leave from 29th November onwards.

Dr. E. B. Bate was acting M.O.H. from 15th April until 1st September.

Mr. T. J. Gibbs, Town Warden, absent on leave from 1st to 29th January and from 15th October onwards.

Mr. G. B. Morey, Assistant Town Warden, absent on leave from 6th February until 7th June; acted for Town Warden during his absence.

The duties of the Town Warden comprise such work as clerk to the Assessment Committee of Bathurst, the preparation of rating lists, the collection of rates and the Court work connected therewith, in addition to his sanitary work. This is an unfortunate arrangement, which is a constant handicap to sanitation in Bathurst.

The rating value of Bathurst shows a considerable increase during the last few years, and, *pari passu*, the corresponding work which devolves on the Town Warden has increased. The time for this can only be taken from that which would otherwise be devoted to practical sanitary work, and is a loss which, as Chairman of the Board of Health, I can only deplore. I sincerely trust that, in the near future, all duties connected with the rating of the town and the collection of taxes may be vested in a separate department or official.

Native Staff.—A clerk to the M.O.H. was appointed in January, and four to five native Sanitary Inspectors were employed in Bathurst throughout the year. The number of labourers employed varied with the amount of sand-filling, clearing, etc., in hand at different parts of the year; there is, however, a permanent residue constantly retained for routine work, and the Sanitary Labourers' compound remains of great advantage in housing them all.

Offices and Quarters.—The whole of the house at No. 9 Buckle Street was acquired on lease in June for use as offices for the Board and for quarters, etc. Additional much needed storeroom is therefore available, and the whole has been put in good repair.

A more suitable arrangement for the stabling of the Board's horses is desirable.

The building (No. 8 Wellington Street) formerly held as a possible Sanitary Station has now become offices for another Government Department, and its place taken by the quarters known as the "Dovecote" at the back of the Police Station, in Buckle Street, which are in temporary use as an office for the M.O.H.

The erection of an Isolation Hospital along the Cape Road has not yet been started.

II. PREVENTIVE MEASURES.

(a) MOSQUITO- AND INSECT-BORNE DISEASES.

The 1915 rains in Bathurst amounted to slightly less than in the preceding year, and did not present so concentrated a fall in August.

Malaria.

Malaria was prevalent among the native population in September and October, many cases doubtless coming into Bathurst from outlying districts. The M.O.H. reported that, in Bathurst, "the breeding grounds for the Anopheles are as follows:—(1) The swampy area which lies behind Government House, No. 1 Bungalow, the Old Military Hospital and the Hospital. (2) That portion of the town by Thomas Street, Allen Street, and the main drain. (3) Fitzgerald Street. The area mentioned as (2) is without exception the most insanitary and unsatisfactory in Bathurst."

Owing, no doubt, to the lighter flooding of these parts there were but few small fish to deal with the Anopheles larvæ, so oiling was extensively employed.

Yellow Fever.

No yellow fever occurred throughout the year in the Colony or Protectorate. A case which at first aroused suspicion was the death of a Syrian trader at MacCarthy Island in October, under the care of the native dispenser in charge. An immediate and thorough investigation was made in the station, which left no doubt that death had resulted from a neglected malaria.

Mosquito Index.

This has been carefully watched throughout the year in Bathurst, and a monthly index made by the M.O.H. and Town Wardens. In every case 150 compounds were examined, representing practically every tenth compound. The results were as follows:—

PERCENTAGE OF INFECTED COMPOUNDS.

January	...	...	2 per cent.	July	...	...	15½ per cent.
February	...	...	2 „	August	...	...	14·2 „
March	...	...	?	September	...	...	7·3 „
April	...	...	12 „	October	...	...	6·6 „
May	...	...	10 „	November	...	...	6·6 „
June	...	...	10 „	December	...	...	1·3 „

These results show considerable improvement compared with the previous year, when, for instance, the return showed 53 per cent. infected compounds in June and 64 per cent. in October.

The following comparative table for 1914 and 1915 shows the proportion of larvæ taken from wells and other water receptacles in Bathurst:—

		1914.		1915.		
		Wells.	Various Receptacles.	Wells.	Various Receptacles.	
1st Quarter	...	42	56	...	23	89
2nd	„	88	232	...	78	119
3rd	„	86	213	...	73	168
4th	„	21	298	...	5	67
Total		...	237	...	179	443

The table shows a general reduction for 1915 for both classes. Boats and canoes are included under the term “Various Receptacles.” It is now the rule to have all craft inspected each Saturday, and a fair number have been found to contain larvæ, but now the vast majority of canoes are always to be found upside down. A few sharp lessons of having holes bored in the bottom of these canoes has had a most excellent effect.

Of the various kinds of mosquitoes which infest Bathurst there is no doubt that the *Stegomyia* easily takes the first place as shown by the following record of specimens taken throughout the year:—

LARVÆ FROM ALL SOURCES.

		Stegomyia.	Culex.	Anopheles.	Steg./Culex.	St./An.
1st Quarter	...	105	1	0	5	1
2nd	„	186	3	1	7	0
3rd	„	192	22	1	22	4
4th	„	63	7	0	2	0
Total	...	546	33	2	36	5

A total of 622 specimens were taken and examined with, roughly, the following percentages:—

Stegomyia	...	...	...	94	per cent.
Culex	...	...	...	5.5	„
Anopheles	...	...	...	0.5	„

In view of what is stated on page 15 (“Bush Clearing”) the low percentage of *Culex* breeding in the town is somewhat notable, but the extremely high *Stegomyia* percentage points to the absolute necessity of making a determined campaign against the conditions of mosquito breeding in compounds. Although a commencement has been made towards the extermination of the mosquito in Bathurst, and a certain reduction already effected, the existing state of affairs is only too favourable to the spread of yellow fever if it should gain ground in Bathurst, so no relaxation of our efforts can be permitted.

Splenic Index.

A splenic index of the school children in Bathurst was taken in the month of September, with the following results:—

		Number Examined.		Enlarged Spleens.		Index.
Boys	...	392	...	119	...	30.3 per cent.
Girls	...	213	...	63	...	29.1 „
Total	...	605	...	182	...	30.08 „

In making the above index, which was done by the M.O.H., the classification of spleens adopted was as follows :—

1. A spleen that cannot be palpated.
2. A spleen that can be palpated on deep breathing.
3. A spleen that is a finger's breadth below the costal margin.
4. A spleen that is two or more fingers' breadth below the costal margin.
5. Ague cake, or very large spleen.

It is of interest to note that no spleen was noted under head five at this examination, although one or two have been subsequently seen. Percussion as well as palpation was used.

Anti-mosquito Measures.

The methods that have been used are as follows :—(a) Frequent prosecutions, (b) frequent inspections, (c) stocking wells with larvæ-eating fish, (d) greater care exercised by the public in covering their water-pots and straining their water, (e) bush clearing.

(a) *Frequent prosecutions.*—In this respect the number of persons prosecuted has been the largest on record. All cases in which mosquitoes are found are prosecuted, with the exception of those persons on whose premises the specimen taken shows only one or two larvæ, with clean water. This is a matter which has a distinct bearing on the reduction of larvæ as, previously to this year, it was a common matter to have almost every specimen of larvæ contained in *dirty* water ; now this is the exception.

Comparison with previous years shows :—

NUMBER OF PERSONS FINED FOR HAVING MOSQUITO LARVÆ ON PREMISES.

Year	...	...	...	1912.	1913.	1914.	1915.
Number	...	...	...	9	164	198	407

(b) *Frequent inspections.*—This is above all the one method of obtaining good results. During the year the total number of inspections of compounds made amounted to 49,211, being an increase of 3,624 over the number of inspections made in the previous year. It is more than difficult to instil into a native inspector the necessity for accuracy and also a certain amount of enthusiasm for his work, but, on the whole, although there is much to be desired, the work of the inspectors shows an improvement. The Town Warden is unfortunately compelled to spend much time in the collection and assessment of the town rates, and therefore his services have been lost for sanitary purposes to a great degree, yet his having to visit compounds on the above duty gave him an opportunity of viewing the town, even though it was spread over a long time. The Assistant Town Warden has been as active as ever in the performance of his duties. One result of frequent inspections reveals the fact that the compounds are cleaner, and a very noticeable fact that there is a marked diminution in the number of water-bearing articles in the compounds, such as old kerosene tins and bottles.

(c) *Stocking wells with fish.*—Considerable attention has been paid to this means of protecting wells from mosquito larvæ. During the year an amendment to the Public Health Ordinance of Bathurst was introduced which gave legal recognition to the protection of wells by suitable fish-stocking, and throughout the year a total of 324 wells have been stocked (as compared with 94 in the previous year), with excellent results.

(d) *Greater care exercised by the public.*—Some improvement is certainly noticeable; it is now quite a common thing to find that the cooler in a compound is covered with a clean linen cloth, which is tied over the mouth of the pot. Very often the water is screened through the cloth before being placed in the cooler. Frequently on inspection of a street by the M.O.H. or Town Wardens word is passed along and, on arrival, only empty pots and moist ground are found, owing to practically every water-bearing pot being upset. This has its advantages in emptying vessels which possibly would not have been emptied if an inspection were not going on.

(e) *Bush clearing.*—Clearance of undergrowth has been extensively carried out round the town and in the Old Cemetery. The latter clearing revealed the fact that there were three fresh water lagoons at the western extremity of the cemetery near to the seashore which were swarming with larvæ *Culex*. It was known that at certain periods, and when the wind was in the west or north-west, frequently great swarms of mosquitoes invaded the town, so that it was not unusual to be able to capture fifty to a hundred specimens of *Culex* from one ordinary sized window of mosquito gauze within two or three minutes. The cemetery was suspected of being the culprit and a close inspection revealed the above condition.

The difficulty arose how to treat these comparatively large expanses of water and it was decided to fish-stock the two largest, about a dozen buckets of small fish obtained from the drains being carefully placed in them. The results were most satisfactory; the fish increased in number and the larvæ disappeared entirely. The third lagoon—the smallest—together with several isolated pools were regularly oiled once a week, but this proved less satisfactory, as the prevailing strong north-west wind constantly swept the film of oil to the leeward side of the pools, leaving the surface uncovered.

The large salt water lagoon in which *Culex thalassius* breeds, referred to on page 14 of the Annual Medical Report for 1914, was stocked with some forty buckets of fish taken from the same drains as the above, with equally satisfactory results. It is of interest to note that these fish appear to be able to acclimatise themselves to either brackish or salt water, and they are of untold value to Bathurst, since they can be obtained for nothing and are voracious eaters of larvæ. Constant care is, however, necessary to keep up the stock in the lagoons owing to wastage from predatory birds, such as egrets and kingfishers. Pits dug in the bottom of the pools afford some shelter to the fish.

(b) EPIDEMIC DISEASES.

Small-Pox.

Small-pox was very prevalent in the early half of the year in the Protectorate, as stated on page 7, but less so in Bathurst. Twenty cases were treated in the Infectious Diseases Hospital, with two deaths. Fumigation of infected and suspected premises was carefully carried out, together with vaccination of contacts.

The following results from vaccinations were obtained in Bathurst and the Protectorate during the year:—

RETURN OF VACCINATIONS.						
				Bathurst.		Protectorate.
Successes	...	...	...	571	...	1,145
Failures	...	...	...	58	...	223
Not seen	...	...	...	31	...	689
Total				660	...	2,057

The Dispenser in charge of the hospital at MacCarthy Island was appointed Public Vaccinator for that station.

Dysentery and Diarrhœa.

Dysentery and Diarrhœa were somewhat noticeable in Bathurst during and after the rains. Many of the former were of amoebic origin and reacted well to emetin.

(c) HELMINTHIC DISEASES.

No forms of interest have been seen. *Ascaris* and *Tænia* are not uncommon.

Ankylostomiasis and *Guinea Worm* are extremely rare, but *Elephantiasis* is occasionally seen in the Protectorate.

III.—GENERAL MEASURES.

SEWAGE DISPOSAL.

An improved and enlarged type of latrine has been introduced in place of two of the old ones, and it is hoped that this process may be continued to replace several of the older ones in use.

Several much needed improvements in dealing with sanitation and the disposal of sewage, such as a sanitary tramline and jetty, have been set aside until a more favourable opportunity.

During the year 38 cess-pits have been closed and 185 have been oiled. It is found that when waterlogged they are a common breeding place for *Stegomyia*.

DISPOSAL OF RUBBISH.

The collection of rubbish by house to house visitation has been improved by the use of a four-wheeled tip cart, and is undoubtedly far more satisfactory than the use, alone, of public dustbins. The incinerators give good results, but at least one additional one is urgently required.

A barge has been purchased for the use of the Board, and old tins and irons, etc., are now carried out and dumped in deep water in the creek at the back of the town; this is found to be a better method of disposal than the former burial of such refuse in low-lying sites.

The use of screened waste from the incinerators is continued.

WATER SUPPLY.

The pipe-borne water supply from Lamin to Bathurst is nearing completion. Standpipes were erected in various parts of the town and provided with a shallow cement basin for the waste water, at ground level. It was hoped that the water would pass freely through an iron grating in the bottom of the basin, along a pipe, to a small soakaway area adjacent to each standpipe, but, after one or two experimental pumpings of water from the intake, it was found that the pipe between the basin and soakaway became choked with sand washed down it, with the result that standing water occurred in the basin.

The basins are now being replaced by a concrete block round the standpipe, surrounded by a soakaway area of rubble.

SURFACE AND SUBSOIL DRAINAGE.

The surface drainage of Bathurst remains in much the same unsatisfactory state as was described in the Annual Medical Report for last year.

At the Box Bar outlet the sluice gates have been renewed and improved.

The introduction of lengths of iron piping, passed underneath the sluice gates, from the drain to well below high-water level on the beach (and closable at the outer end, when submerged, by an old iron cannon ball), has proved very successful in permitting the outflow of storm-water from the drains for a longer period between the tides than was hitherto possible. It has also decreased the amount of labour previously required to clear away the sand which banks up outside the sluice gate.

The arrangement is in force at the outlets of the Picton Street and Blucher Street drains on the beach in Wellington Street, and it is undoubtedly due to this system, as well as to the lesser concentration of the rain in August, that Bathurst was under water to a less extent and for a shorter time this year than in 1914.

Such a measure, however, although valuable, can only be regarded as palliative, and a careful regrading and rearrangement of the drainage system of the town is necessary.

The introduction of the pipe-borne water supply has not been associated with any scheme for the removal of the waste water from either public or private supplies. Subsoil water in Bathurst is always dangerously near the surface, and it is at least possible that the addition of waste from the pipe supply may produce standing water in certain areas, particularly during the rains. It was, indeed, found in one case, after the erection of the standpipes and drip-basins, that stagnant water remained, not only in the basin, but on the surface of the soil for an appreciable distance round the pipe.

At the best, such waste water can only soak into the soil and percolate into the drains, and it may be found that these drains, which at present are practically entirely empty during the dry season (roughly from October to the end of May), will contain residual water which cannot escape freely, owing to the limited grading, but which may prove a source of mosquito breeding.

One cannot prophesy concerning this, but it is a matter concerning which an expert engineering opinion is desirable. Certainly water will be far more freely used on all sides when there is not complete dependence on small wells and the comparatively slight storage of rain water in tanks, which is the system at present in vogue in Bathurst.

When the water supply is laid on at private houses it will be essential that provision be made for dealing with the waste. Nothing has yet been done in this direction, and it is now for the third year in succession that attention has been called to the subject in the Annual Medical Report.

“DUTTON SCHEME.”

Under the Dutton scheme for the improvement of Bathurst much has been done during the year. The sand-filling of the low-lying area near Box Bar, north-west of Clifton Road, was completed in the early part of the year, and sites were at once allotted for the natives expropriated from Victoria Street to provide room for new bungalows along the Marina.

Three new bungalows, built in accordance with plans suggested at the Second Conference of P. M. O's held in Lagos in 1912, have been erected and form a welcome addition to the number of quarters available for European officials. It is not now intended to erect further bungalows along the Marina, owing to lack of space, and one such bungalow has been diverted to form offices attached to Government House.

Sand-filling has been carried out also in various parts of the town, particularly in Lancaster and Albion Places, Hurst Street, Charles Street and

Williams Street, while several streets at the back of the town have been levelled and improved, including Otto Road, Haddington Street and Oxford Street.

The swamp at the north-west of the town between the Cape Road and the Old Cemetery has also been partially filled in with sand.

GOVERNMENT BUILDINGS.

The *Prison Buildings* have been well looked after and maintained.

The *Victoria Hospital* has been rendered lighter and more airy by the substitution of casement windows for many of the old sash windows, together with many other slight improvements and repairs. It is still, however, undesirable and unsatisfactory in most respects. The new male and female wards and the laundry are not yet erected. The Out-patient building—a wooden shed—is unattractive and ill-adapted for its purpose.

The *Home for Destitutes* has been maintained in fair condition as far as the building is concerned. Constant attention is required for such minor repairs as mosquito proofing, etc.

The *West African Frontier Force Lines* were vacated when the Gambia troops left for the Cameroons, and placed under the control of the police. The sanitary condition was cared for by the Board of Health.

The *Infectious Diseases Hospital*, situated off the Cape Road, about two miles from Bathurst, continues to fulfil its functions satisfactorily.

The *Market and Slaughter House* have been satisfactory. The following slaughterings are recorded:—

Bullocks	...	...	...	...	...	1,399
Sheep	...	...	...	...	...	253
Pigs	...	...	...	...	...	149

Under the new regulations inspection of cattle is systematically carried out and slaughtering allowed only between certain hours. The meat is of good quality.

STREETS.

Much progress has been made in rectifying encroachments, and several streets have been straightened out. Victoria Street has been closed and the occupants expropriated under the “Dutton Scheme” of improvements.

The lighting of the town remains inadequate, but no improvement has been possible under the present conditions until more funds are available.

In certain parts improvements have been made in the levelling of the grass-grown streets, and sand-filling carried out as far as possible.

WELLS AND TANKS.

All Government tanks have now been numbered, which materially aids in the speedier repair of such as are out of order. Inspections are constantly made and they have been kept in a satisfactory state.

The anti-mosquito device referred to on page 22 of the Annual Medical Report for 1914 was in use throughout the rainy season at the inlet of a large rain-water tank. It required no attention and has proved perfectly satisfactory in preventing the tank from being a source of mosquitoes, without any use of mosquito gauze. If the use of rain-water tanks is to be continued in Bathurst, it would be of considerable advantage to have such a contrivance fitted to each tank.

INSTRUCTION IN HYGIENE.

The usual course of lectures was given, and also attended by the Sanitary Inspectors and Ward Attendants.

At the schools in Bathurst and MacCarthy Island the following results were obtained :—

School Hygiene Examinations.

			Number examined.		Percentage of Passes.	
Standard	VII.	...	10	...	90	per cent.
„	VI.	...	37	...	70	„
„	V.	...	42	...	40·5	„
Total			89	...	58·5	per cent.

LEGISLATION.

The following Ordinances, Rules and Regulations, of importance to Public Health, were passed during the year :—

An Ordinance to provide for the Regulation and control of the supply of pipe-borne water to the town of Bathurst and its environs.

An Ordinance further to amend the Public Health Ordinance, 1912.

The Market (Consolidation) Rules, 1915.

Order made by the Governor-in-Council under Section 65 of the Public Health Ordinance, 1912.

Regulations made by the Governor-in-Council under Section 108 of the Public Health Ordinance, 1912.

RECOMMENDATIONS FOR FUTURE WORK.

The following list of recommendations includes most of those which were suggested in 1914, few of which could be carried out owing to lack of funds, etc. :—

- (a) A sanitary station.
- (b) Revision and extension of the surface drainage of Bathurst, in connection with the pipe-borne water supply to the town.
- (c) A sanitary tramline and dejection jetty.
- (d) Improved lighting of Bathurst.
- (e) Additional incinerator.
- (f) Additional public latrine.
- (g) Slaughter house and latrine pumps.

In conclusion, I have again to acknowledge the willing assistance that I have received throughout the year from Dr. R. W. Orpen, Medical Officer of Health, from whose report of work done this report is largely compiled ; from Mr. T. J. Gibbs, Town Warden of Bathurst, and Mr. G. B. Morey, Assistant Town Warden.

A. E. HORN,

Senior Medical Officer.

11th March, 1916.

MACCARTHY ISLAND AND THE PROTECTORATE.

Owing to the shortage in the medical staff, no Medical Officer was attached for duty in the Protectorate or at MacCarthy Island station. The Senior Medical Officer accompanied the Governor on his tours of inspection in various parts, and was thus able to become acquainted with the medical and sanitary conditions prevailing in the Upper River Province, MacCarthy Island Province and the South Bank Province, during the dry season.

The MacCarthy Island Hospital remained in the charge of Dispenser J. J. Thomas, and much useful work has been performed there.

In the Protectorate generally no epidemic besides small-pox has occurred, and the health of the community has been good.

The towns and houses are of primitive construction, consisting of a more or less close aggregation of huts, composed for the most part of "krinting" (*i.e.*, interwoven slips of bamboo) or reed fence walls, with grass thatch roofs. A certain proportion of houses throughout the country are built with mud walls.

In the Kombo part of the Kombo and Fogni Province, and in the North Bank Province, the towns are frequently spacious and well laid out, the main streets passing out at right angles to the sides of a central square, but in the other Provinces apparently little or no system has been employed in planning a town, which only too frequently consists of a close conglomeration of huts crowded in a yard or compound, and narrow passages or streets.

With the exception of certain trading stations situated along the river and creeks, there are no large markets. Cattle are killed at comparatively infrequent intervals and the slaughtering takes place in the "bush" outside the town or village.

No sanitary arrangements, such as latrine buildings or pits, exist throughout the Protectorate, with the exception of MacCarthy Island, where a latrine has been erected by Government over the river bank. In the native towns of every other part the use of the "bush" outside the town is general—a small slightly more wooded patch of land being perhaps selected. An attempt was made to introduce the use of latrine pits at the back of the town at MacCarthy Island without success, and it must be admitted that the primitive system in general use does not appear to be associated with any ill results, the light dry sandy soil and the hot sun rendering excreta innocuous in a very short time, at any rate during the dry season.

Large swamp areas, particularly in the lower river provinces, which are dried up in the absence of the rains become flooded in the wet season and are utilised for growing rice.

No case of trypanosomiasis was found among the sick examined and treated by the Senior Medical Officer during these tours of inspection. Records are still being kept, as far as possible, of the progress of the cases of Sleeping Sickness investigated by Dr. Todd in 1911, but there is still no obvious spread of the infection. Leprosy is seen, but rarely. Elephantiasis is present, but not to a large extent.

Water is drawn from public wells, of which there are generally three or four to each town, and which may attain a depth of 60 ft. It varies in quality in different parts. Mosquitoes do not appear to breed in these wells, and but

little standing water is kept in the houses, as water is drawn twice daily. Still, *Culex* mosquitoes are present in many towns, even under these conditions, but I have not yet come across *Stegomyia*.

It is of importance to remember that the physical conditions of the Protectorate are widely different during the dry and wet seasons. Whereas in the former even the lowest lying parts are dried and frequently arid lands, in the rains the same country may be converted into miles of swamp. With the exception of MacCarthy Island and certain trading stations, the Protectorate is practically not inhabited by Europeans during the latter season, as travelling, apart from the river, is rendered a matter of considerable difficulty owing to swamps and floods. No effective sanitary control of the Protectorate, therefore, as regards mosquito breeding, etc., can be maintained under these conditions, and this must be borne in mind in considering the relationship of this portion of the country to Bathurst in connection with possible foci of epidemic disease.

DEPARTMENTAL CHANGES.

Names.				Office.	Remarks.
F. C. V. Thompson	...	...	...	Medical Officer	Serving in the Cameroons.
R. H. Miller	...	...	...	Medical Officer	Serving in Somaliland.
E. B. Bate...	...	...	...	Medical Officer	Appointed 16th January.
J. C. Watt	...	...	...	Medical Officer	Appointed 25th September.
L. E. H. Maulton...	...	...	...	Nursing Sister	Serving in the Cameroons.
P. R. di Menna	...	...	...	Nursing Sister	Served in the Cameroons and resigned 6th October.
E. A. Bernard	...	...	...	Nursing Sister	Services terminated 22nd September.
M. M. Hall	...	...	...	Nursing Sister	Appointed 25th April. Serving in the Cameroons.
C. Shaw	...	...	...	First Grade Clerk	On leave 8th May to 27th August.
S. B. Palmer	...	...	...	Second Assistant Dispenser and Dresser.	Serving in the Cameroons.
J. F. Jagne	...	...	...	Junior Assistant Dispenser and Dresser.	Appointed 1st March.
E. C. Bruce	...	...	...	Female Attendant	Appointed 13th December.
J. P. nJie	...	...	...	Fourth Grade Clerk	Appointed 1st March. Dismissed 3rd November.

TABLE VI.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS), 1915.

Diseases.	Remaining end of 1914.				Admissions, yearly total.				Deaths, yearly total.				Total cases treated.				Remaining in hospital at end of 1915.				Remarks.
	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.	
Malarial fevers ...	2	—	—	2	105	2	4	111	1	—	—	1	107	2	4	113	1	—	—	1	
Small-pox ...	—	—	—	—	18	—	2	2	—	—	1	1	—	—	2	2	—	—	—	—	
Dysentery ...	—	—	—	—	3	3	—	5	5	1	—	6	18	3	—	21	1	—	—	1	
Sleeping sickness ...	—	—	—	—	2	—	2	2	—	—	—	—	2	—	2	5	—	—	—	—	
Gonorrhœa ...	—	—	—	—	13	—	1	14	2	—	—	1	13	—	1	14	2	—	—	2	
Parasitic disease...	—	—	—	—	2	—	—	2	1	—	—	2	3	—	—	3	—	—	—	—	
Tetanus ...	1	—	—	1	9	—	2	11	—	—	—	—	9	—	2	11	—	—	—	—	
Rheumatism ...	—	—	—	—	2	—	1	3	1	—	—	1	2	—	1	3	—	—	—	—	
Marasmus ...	—	—	—	—	10	1	—	11	—	—	—	—	10	1	—	11	—	—	—	—	
Debility ...	—	—	—	—	1	—	—	1	—	—	—	—	1	—	—	1	—	—	—	—	
Syphilis ...	—	—	—	—	2	—	—	2	—	—	—	—	2	—	—	2	—	—	—	—	
Appendicitis ...	—	—	—	—	1	—	—	1	—	—	—	—	1	—	—	1	—	—	—	—	
Beri-beri ...	—	—	—	—	3	—	—	3	2	—	—	2	3	—	—	3	—	—	—	—	
Enteric fever ...	—	—	—	—	1	—	—	1	—	—	—	—	1	—	—	1	—	—	—	—	
Fistula in Ano ...	—	—	—	—	2	—	—	2	1	—	—	1	2	—	—	2	—	—	—	—	
Septicæmia ...	—	—	—	—	1	—	—	1	—	—	—	—	1	—	—	1	—	—	—	—	
Heat stroke ...	—	—	—	—	4	—	—	4	—	—	—	—	4	—	—	4	—	—	—	—	
Tuberculosis (Phthisis) ...	—	—	—	—	12	—	3	15	2	—	1	2	12	—	3	15	—	—	—	—	
Diseases of the nervous system ...	—	—	—	—	5	—	—	5	—	—	—	—	5	—	—	5	—	—	—	—	
" " eye ...	—	—	—	—	2	—	—	2	—	—	—	—	2	—	—	2	—	—	—	—	
" " ear ...	—	—	—	—	6	—	—	6	—	—	—	—	6	—	—	6	—	—	—	—	
" " nose ...	—	—	—	—	12	—	1	13	—	—	—	—	12	—	1	13	—	—	—	—	
" " circulatory system	—	—	—	—	73	—	5	78	10	—	1	10	73	—	5	78	2	—	1	3	
" " respiratory system	—	—	1	1	63	1	4	68	5	—	—	5	63	1	5	69	2	—	—	2	
" " digestive system	—	—	—	—	1	—	2	3	—	—	—	—	1	—	2	3	—	—	—	—	
" " lymphatic system	—	—	—	—	23	—	—	23	2	—	—	2	23	—	—	23	2	—	1	3	
" " urinary system ...	—	—	—	—	14	—	2	16	—	—	—	—	14	—	2	16	2	—	—	—	
" " generative system	—	—	—	—	18	—	—	18	1	—	—	1	19	—	—	19	—	—	—	—	
" " pregnancy and parturition	1	—	—	1	2	—	—	2	—	—	—	—	2	—	—	2	—	—	—	—	
" " the female breast ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
" " organs of locomotion	—	—	—	—	27	—	2	29	—	—	—	—	27	—	2	29	1	—	—	1	
" " connective tissue	—	—	—	—	24	—	9	33	2	—	—	2	24	—	10	34	1	—	1	2	
" " skin ...	—	—	1	1	27	—	2	29	—	—	—	—	27	—	2	29	1	—	—	1	
Injuries ...	—	—	—	—	64	—	—	64	3	—	—	3	64	—	—	64	—	—	—	—	
Surgical operations ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
No appreciable disease ...	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	1	—	—	—	—	
TOTAL ...	4	—	2	6	552	7	46	605	41	1	3	45	556	7	48	611	15	—	3	18	

TABLE VII.
OUT-PATIENTS.
SHOWING DETAILS OF CASES IN 1915.

Diseases.	Bathurst.	Prison Infirmary.	MacCarthy Island.	Total.
Malarial fevers	752	10	47	809
Beri-beri... ..	3	—	—	3
Anæmia	18	7	7	32
Gonorrhœa	15	2	33	50
Debility	23	1	21	45
Dysentery	13	3	18	34
Rheumatism	290	23	152	465
Parasitic disease	146	16	43	205
Marasmus	—	—	1	1
Tuberculosis	3	—	—	3
Sunstroke	—	—	1	1
Tetanus	1	—	—	1
Syphilis	6	—	6	12
Small-pox	—	—	2	2
Leprosy	—	—	1	1
Goitre	—	—	5	5
Diseases of the nervous system ...	167	3	23	193
" " " eye	282	4	23	193
" " " ear	78	3	20	101
" " " nose	44	3	1	48
" " " circulatory system ...	14	—	19	33
" " " respiratory system ...	1,598	22	129	1,749
" " " digestive system ...	2,076	71	392	2,539
" " " lymphatic system ...	18	3	—	21
" " " urinary system ...	30	4	8	42
Affections connected with pregnancy ...	7	—	3	10
" " " parturition... ..	5	—	—	5
Diseases of the female breast	7	—	2	9
" " " organs of locomotion ...	160	2	2	164
" " " connective tissues ...	133	5	7	145
" " " cellular tissues	15	—	—	15
" " " skin	525	18	169	712
Injuries	359	20	44	423
Undefined	5	10	19	34
TOTAL	6,830	230	1,244	8,304

		Bathurst.	MacCarthy Island.
Old cases		3,237	675

The undermentioned returns and tables have been omitted :—
Result of treatment at the Victoria Hospital, 1915.
Tables I. (Return).
Appointments, Leave of Absence, Transfers, Promotions, Termination of Appointments.
Table III. (Return).
Table IV. ,,
Table V. ,, (A) and (B).

